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RESPONSE OF COTTON VARIETIES TO NITROGEN APPLICATION UNDER IRRIGATED CONDITIONS IN CHAMBAL COMMAND

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An experiment was conducted at the Government Agricultural Farm, Morena (M P) to study the response of Cotton varieties to nitrogen application under irrigated conditions in Chambal Command in two Kharif seasons during 1976 and 1977. Results revealed that out of three levels of nitrogen (0, 40 and 80 Kg N/ha) 80 Kg N/ha gave economically higher yield of seed cotton. The highest yield of seed cotton was recorded in variety Bikaneri Nerma, but was at par with other varieties viz. SH 131, C59-228, J-34 and J. 207.

Cotton is one of the important fibre crops in the North-West regions of Madhya Pradesh. About 12 thousand hectares of land was under the short staple varieties, till thirties, but its cultivation abandoned in forties due to decline in market demand for short staple cotton, climate vagaries and severe infestation of insect pests. With the implementation of new irrigation project in Chambal Command, the possibilities of reintroduction of cotton got encouragement. Hence the present investigation was carried out with the object of finding a suitable variety and an economical dose of nitrogen for reintroduction of cultivation in the Chambal Command of northern MadhyaPradesh. The efficacy of nitrogen application in cotton was already established through various field experiments earlier The response of cotton to 80kg N/ha was also obtained by Upadhyay *et al.* (1977). The Northern Madhya Pradesh soils are low in nitrogen content and have shown the response to nitrogen fertilizer (Table 1.) Very little work has been done on the response of cotton to nitrogen under irrigated conditions of Northern Madhya Pradesh. Hence the present investigation.

Table 1, Mechanical analysis of soil (Average of two years)

S. No.	Soil components	Percentage
1.	Sand	60.8
2.	Silt	18.8
3.	Clay	20.0

Chemical analysis of soil (Average of two years)

S. No.	Constituents	Amount present
1.	Available nitrogen	72.2 kg/ha
2.	Available phosphorus	22 2 kg/ha
3.	Available potash	156.5 kg/ha
4.	Organic carbon	0.41%
5.	Electric condiuctivity	0.2 m. mhos/cm
6.	pH of soil	8.0

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MATERIALS AND METHODS

The field investigations were carried out to assess the nitrogen requirement of cotton varieties (G. hirsutum) during *Kharif* seasons of 1976 and 1977 on low fertile sandy loam soils (Table 1) at the Government Agricultural Farm, Morena (M.P.). Five varieties (Bika Neri Nerma, J-34 C59-228, SH. 131 and J. 207) were tested with three levels of nitrogen (0, 40 and 80 kg N/ha) in split plot design replicated three times, keeping varieties in main plots and nitrogen levels in sub - plots. The crop was uniformly fertilized with 40 kg P_2O_5 and 40 kg K_2O/ha along with half dose of nitrogen/ha (as per treatments) at the time of sowing as basal. The remaining quantities of nitrogen were applied in two equal splits at 45 and 75 DAS in both the years. The crop was sown on 1-7-1976 and 14-6-1977 with the spacing of 60X30cm. The pre-irrigation was applied before sowing in both the years and after sowing one or two irrigations were given. The weather conditions were more favourable in 1977 compared to that prevailed in 1976. During the early growth phase of the crop in June-July, a rainfall of 93.90 mm and 302.7 mm was received in 1976 and 1977. The total reinfall recorded in 1976 and 1977 was 591.23 and 912 0 mm.

RESULTS AND DISCUSSION

Results presented in Table 2 reveal that the levels of nitrogen has a significant influence on the height of the plant (cm.) and number of bolls/plant. Although the plant height increased with increasing levels of N, the two levels of N tried N 40 and 80 kg N/ha were on par. Qureshi (1966) and Verma *et al.* (1966) also reported significant increase in height with nitrogen application.

The number of bolls/plant was significantly increased due to nitrogen application in both the years. These findings are in agreement with those of earlier workers (Singh *et al.*, 1970 Singh and Mathur, 1971); The application of nitrogen resulted in higher seed cotton yield over control in both the years. The maximum seed cotton yield was obtained at 80 kg N/ha in both the years but was at par with 40 kg/ha in 1976, while it was significantly higher than 40 kg N/ha in 1977.

In general, seed cotton yield was higher (1546 kg/ha) in 1977 than in 1976 (504 kg/ha). The higher seed cotton yield was probably due to favourable climatic conditions that prevailed in 1977. The low yield recorded in 1976 may be due to severe moisture stress during the active crop growth phase for a period of about a month from mid june to mid july as revealed by the reduction in number of bolls/plant.

Table 2. Effect of different levels of nitrogen on growth, yield and yield attributes of cotton

Treatments	Yield kg/ha			No. of bolls/plant			Height (cm)			Plant population (000/ha)		
	1976	1977	Mean	1976	1977	Mean	1976	1977	Mean	1976	1977	Mean
0 kg N/ha (N_0)	305	1078	691.5	2.50	7.90	5.20	51.8	69.7	60.7	74074	70030	72052
40 kg N/ha (N_1)	462	1310	886.0	4.10	9.60	6.80	60.3	88.8	74.5	77441	70292	73866
80 kg N/ha (M_2)	504	1546	1025.0	4.72	11.50	8.10	65.6	89.8	77.7	77441	71156	74298
C. D. (5%)	68	155	—	0.5	1.1	—	6.7	9.4	—	N. S.	N. S.	—

N. S. = Not significant.

Table 3. Effect of different varieties on growth, yield and yield attributes of cot

Treatments	Yield kg/ha			No. of bolls/plant			Height [cm.]			Plant population [000/ha]		
	1976	1977	Mean	1976	1977	Mean	1976	1977	Mean	1976	1977	Mean
Beekaneri Nerma	727	1548	1137.5	5.1	12.00	8.50	58.1	76.1	67.1	85859	70987	78422
J. 34	524	1236	880.0	3.6	8.30	5.90	62.9	80.7	71.8	85858	71064	78461
C. 59-228	312	1360	836.3	3.7	9.30	6.50	58.8	85.1	71.9	64814	72530	68672
SH-131	428	1533	980.5	5.0	10.30	7.60	57.0	82.4	69.7	70707	71527	71117
J. 207	420	1275	847.5	3.9	9.90	6.90	64.3	89.1	76.7	74074	72350	73212
C. D. (5%)	117	N.S.	—	0.8	1.7	—	N.S.	N.S.	—	N.S.	N S.	—
Interaction (V X N)	N.S.	N.S.	—	N.S.	—	—	N.S.	N.S.	—	N.S.	N S	—

= Not significant.

As the year 1976 being unusual year no recommdation could be made on this basis. While the response in 1977 was linear, as such it is concluded from the present investigation. that the dose of 80 kg N/ha is most profitable for the cotton crop grown under chambal Command area, Similar results have also been reported by Kairon *et al.* (1980). Upadhyay *et al.* (1977) and Nehra *et al.* (1982).

The perusal of Table 3 reveals that the effect of varieties on all the characters under test was found to be nonsignificant. However, maximum seed cotton yield (kg/ha) was recorded by the variety, Bikaneri Nerma, in both the years, individualy and on pooled average basis. The highest seed cotton yield in Bikaneri Nerma possibly be due to its versatile adaptability in the region as brought out by previous experiments at this centre.

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